CALIFORNIA DIVISION OF MINES AND GEOLOGY

Fault Evaluation Report FER-54

September 2, 1977

1. Name of fault: Oak Ridge fault.

2. Location of fault: Oxnard, Satiacy, Santa Paula, Moorpark, Fillmore, Piru, Simi, Val Verde, and, possibly, Santa Susana 7.5 minute quadrangles, Ventura County (see figure 1).

3. Reason for evaluation: Part of a 10-year program.

4. List of references:

a) Bain, R.J., 1954, Geology of the Eureka Canyon area, Ventura County, California: Unpublished M.A. thesis, University of California, Los Angeles, map scale 1:12,000.

b) Jennings, C.W., 1975, Fault map of California with locations of volcanoes, thermal springs and thermal wells: California Division of Mines and Geology, California Geologic Data Map Series, Map no. 1, scale 1:750,000.

c) Jestes, E.C., 1958, Geology of the Wiley Canyon area, Ventura County, California: Unpublished M.A. thesis, University of California, Los Angeles, map scale 1:12,000.

d) Lung, Richard, 1958, Geology of the South Mountain area, Ventura County, California: Unpublished M.A. thesis, University of California, Los Angeles, map scale 1:12,000.

e) Martin, D.R., 1958, Geology of the western part of the Santa Susana Mountains, Ventura County, California: Unpublished M.A. thesis, University of California, Los Angeles, map scales 1:12,000 and 1:24,000.

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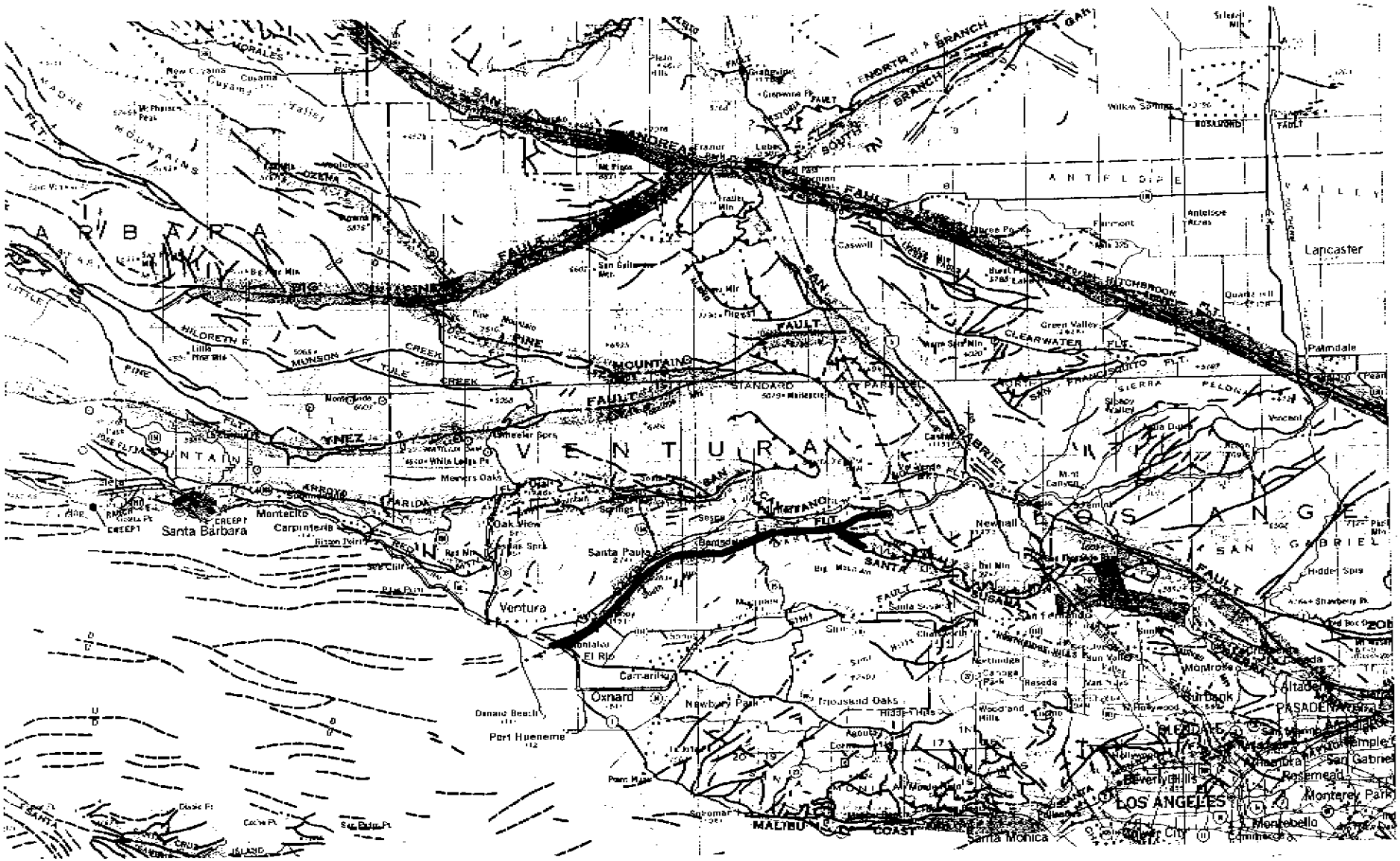
FIGURE 1. General location of the Oak Ridge fault (Jennings, 1975, scale 1:750,000).



f) Nichols, D.R., 1974, Surface faulting in Seismic and Safety Elements of the Resources Plan and Program: Ventura County Planning Department, section II, p. 1-35.

g) Mukae, M.M., and Turner, J.M., 1975, Ventura County water resources management study, geologic formations, structures and history in the Santa Clara-Calleguas area in Compilation of technical information records for the Ventura County cooperative investigation: California Department of Water Resources, v. 1, p. 1-28, 2 plates.

h) Quick, G.L., 1974, Preliminary microzonation for surface faulting in Ventura, California area in Geology, seismicity, and environmental impact: Association of Engineering Geologists, Special Publication, p. 257-262.
Note: Basically contains only information obtained from others; no new data. Not discussed herein.

i) Ventura County Planning Department, 1974, Hazards plate 1 in Seismic and Safety Elements of the Resources Plan and Program: Ventura County Planning Department, plate 1.

j) Ware, G.C., Jr., and Stewart, R.D., 1958, Bridge area, South Mountain oil field in A guide to the geology and oil fields of the Los Angeles and Ventura regions: Pacific Section American Association of Petroleum Geologists, p. 180-181.

k) Weber, R.H., Jr., Cleveland, G.B., Kahle, J.E., Klessling, E.F., Miller, R.V., Mills, M.F., Morton, D.M., and Cilweck, B.A., 1973, Geology and Mineral Resources study of southern Ventura

Real, C., 1976, Earthquakes since 1932 in the Transverse Ranges, southern California (8 quality locations): Unpublished data in A-file, map scale 1:250,000.

County, California: California Division of Mines and Geology, Preliminary Report 14, 102 p., 5 pl., 9 figures, map scale 1:48,000.

l) Weber, F.H., Jr., Kiessling, E.W., Sprotte, E.C., Johnson, J.A., Sherburne, R.W., and Cleveland, G.B., 1975, Seismic hazards study of Ventura County, California: California Division of Mines and Geology, Open File Report 76-5LA, 396 p., 9 pl., map scale 1:48,000.

m) Yeats, 30 June 1977, Subsurface evidence of faulting in the Ventura Basin, Transverse Ranges: Unpublished talk given as an U.S. Geological Survey Seminar, Menlo Park.

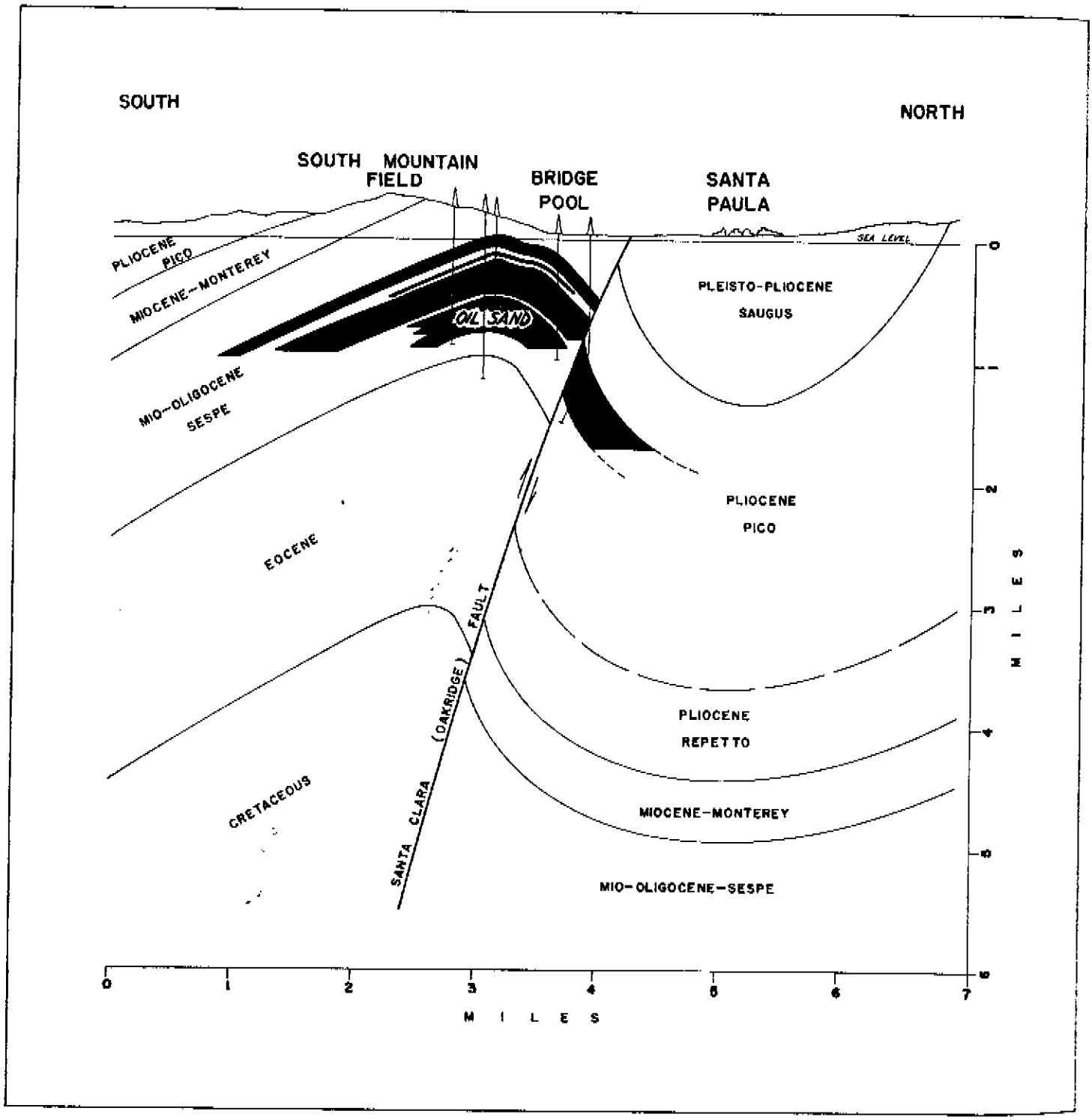
n) Ziony, J.I., Wentworth, C.M., Buchanan-Banks, J.M., and Wagner, H.C., 1974, Preliminary map showing recency of faulting in coastal southern California: U.S. Geological Survey, Miscellaneous Field Studies Map MF-585, 15 p., map scale 1:250,000, 3 plates.

Note: Other theses by Ricketts, Whaley, and Riesser (all at Ohio State University) may cover part of the Oakridge fault, however, neither CDMG nor the USGS has been able to obtain copies of these theses as yet.

5. Summary of available data:

The Oak Ridge fault is a south-dipping (60° to 80°), reverse fault (Martin, 1958, p. 56; Jestes, 1958, p. 32-35; Bain, 1954, p. 29-30; Quick, 1974, p. 257-262; Weber, et al., 1975, p. 175; Nichols, 1974, p. 7; and, Lung, 1958, p. 63-64) along which some left-lateral displacement may have occured (Mukae and Turner, 1975, p. 16-17).

Figure 2. From Ware and Stewart (1958, p. 180).



Some authors (Martin, 1958; Nichols, 1974, p. 7) believe that the eastern end of the Oak Ridge has been truncated by, or overthrust by, the Santa Susana fault; and, at least one person (Yeats, 1977) believes that the Oak Ridge fault dips north at the eastern end. However, I note that the eastern end of the fault is complicated by the western end of the Santa Susana fault, and the north-dipping fault ~~referred to~~ shown by Bain (1954) may indeed by a trace of the Santa Susana fault and not of the Oak Ridge fault (see plate 1). Hart (1977, p.c.) states that Yeats places the overturned section of the Oak Ridge nearer to the Santa Clara Valley, however such is not shown to be the case on any map now available.

Weber, et al. (1975, p. 175) state that the Oak Ridge fault has displaced the San Pedro Formation (lower to middle Pleistocene) "thousands of feet" south of the Fillmore-Piru area. Mukae and Turner (1975, p. 16-17) concluded that displacement has probably occurred during the Holocene along segments of the fault, however, their cross-sections (plate 1) shows the fault as not cutting any unit younger than the San Pedro Formation. Quick (1974) also notes that the groundwater table within the Pico and San Pedro Formations is affected. All other authors referenced show the fault as not cutting Quaternary alluvium.

Weber, et al (1975) indicate the presence of fault related topography (see plate 1) along a possible trace of the Oak Ridge fault. However, any such features are open to question, in my opinion, because they could be formed by erosion (by the Ventura River) or by man. Indeed, where each feature is noted it is always within 100 feet of a road, and on the south edge of the Ventura River flood plain.

Perhaps the most detailed, or at least most comprehensive, subsurface analysis has been performed by Yeats and others. Yeats

summarized their conclusions in a talk before the U.S. Geological Survey in 1977. He stated that between Montalvo and Saticoy, the Oak Ridge fault could not be traced nearer than about 3000 feet from the surface. Further, there is no known evidence that the Oak Ridge cuts units younger than about 1.5 million years old (although he noted these ~~unfaulted~~ same units could be about 0.6 million years old, citing Sarna-Wojcicki's unpublished research). He concluded his talk by stating that while it appeared that the probability of surface fault rupture along the Oak Ridge fault was remote, it may still be capable of generating a large earthquake at some depth. ~~Data in the A-P file~~ Real (1976) notes only one epicenter in the vicinity of the Oak Ridge fault since 1932 (magnitude Richter between 2.0 and 3.0).

Finally, Weber, et al. (1975, p. 175) noted that the Oak Ridge fault west of Saticoy was too ill-defined to plot even at a scale of 1:48,000.

6. Interpretation of air photos:

ERTS imagery (flight 73-006, flown on January 19, 1973, photos 7603-7604, and 7637-7638) were viewed and no lineaments that could be fault-produced were observed.

7. Field observations: Not attempted.

8. Conclusions:

The Oak Ridge fault may be capable of producing an earthquake, however, there is no evidence that surface fault rupture has occurred during the Holocene. Indeed, no person has adequately documented fault displacement more recent than in the early to middle Quaternary. Thus, there is no evidence that the fault is sufficiently active. The western

end of the trace is not even well-defined enough to allow plotting at a scale of 1:48,000 (Weber, et al., 1975, p. 175).

9. Recommendations:

Based on the present project guidelines, and the information summarized herein, the Oak Ridge fault should not be zoned at this time.

10. Investigating geologist's name; date:

Theodore C. Smith
Assistant Geologist
September 2, 1977

I agree with these recommendations.
EWK
9/27/77
However, we should re-evaluate the conclusions & recommendations if & when Yeats releases his report(s) on this fault.